

The Role of Charge Ordering in the Electron Specific heat of CMR Manganites

J K KAR¹, S PANDA^{2†} and G C ROUT³

¹Biju Patnaik University of Technology, Chhend, Rourkela-769015, Odisha, India.

²Dept. of Physics, Trident Academy of Technology, Chandaka Industrial Estate, Bhubaneswar-751024, India.

³Condensed Matter Physics Group, Physics Enclave, Plot No-664/4825, Lane 4A, Shree Vihar, Bhubaneswar-751031, India. Email: gcr@iopb.res.in, Mob: 09937981694

[†]Corresponding author. Email Id: saswatip7@gmail.com

Received: 15.11.2017 ; Revised : 20.12.2017 ; Accepted : 8.1.2018

Abstract: We consider here a tight binding model Hamiltonian which consists of the kinetic energy terms of conduction and core t_{2g} band electrons. The Kubo-Ohata type double exchange interaction is considered among the onsite spins of e_g and t_{2g} band electrons. The transverse antiferromagnetic spin fluctuations in XY plane of t_{2g} band arises due to Heisenberg type spin - spin interactions in the core band. The double exchange interaction induces antiferromagnetism in the XY plane of e_g band. As an extra mechanism we consider here the charge ordering interaction in the e_g band. The model Hamiltonian is solved using Zubarev's Green's function technique and the temperature dependent electron specific heat is calculated. The effect of charge ordering on the electron specific heat is studied.

Keywords: CMR, Charge orderings, Antiferromagnetism

PACS: 75.47.Gk, 71.30. Et, 75.50.Ee

[\[Full Paper \]](#)